Aerial Survey of Drought/Bark Beetle Damage in Walker, Houston, Anderson and Henderson Counties

October 2000

Objective: To monitor the extent and severity of drought and associated bark beetle losses to forest stands in heavily-impacted western fringe counties (Walker, Houston, Anderson, and Henderson counties) of East Texas.

Methods: During October 2000 (before most hardwood foliage turns color), FRD foresters will conduct 100% aerial sketch map surveys of the forested portions of Walker, Houston, Anderson, and Henderson counties to delineate the locations and severity of tree losses to drought and/or *Ips* bark beetles using the following methods.

Aircraft: Contract aerial detection planes (Cessna 160-182) will be used. Preferably, the planes will be equipped with GPS units for documenting latitudes and longitudes of observed damage sites from the air. The pilot will be accompanied by two observers, one for mapping out of each side of the plane. Preferred altitude for effective mapping will be between 1000 – 1500 feet above ground.

Maps and Flight Lines: Aerial observers will sketch map damaged areas onto TFS 15-minute quadrangles (scale = 1 inch/mile) showing forested and non-forested areas, plus roads and other visible landmarks. Prior to the detection flights, parallel north-south flight lines spaced at intervals of 2.5 miles will be drawn on the maps to provide 100% coverage of the pine-forested areas of each county. Each observer will be responsible for mapping observable damage within 1.25 miles of the plane.

Mapping Damage: Observable areas of dead and dying trees exceeding an estimated 5 acres in size will be sketch-mapped as accurately as possible. If the aircraft has a functional GPS unit, the pilot should be instructed to fly directly over the affected area to obtain and record a latitude and longitude. Affected forested stands should be delineated on the map by means of a polygon.

Drought Survey Codes: The following codes should be used to classify each recorded area of damage or polygon:

Category	Description	Code
Stand Description	Young pine plantation (<10 years)	YP
	Older pine plantation (>10 years)	OP
	Mature pine sawtimber	ST
	Pine forest of mixed age classes	MA (optional)
	Pine-hardwood forest	PH (optional)
	Hardwood forest	HD(optional)

% Dead in Stand	25% (10-40%)	1
	50% (41-60%)	2
	75% (61-90%)	3
	100% (91-100%)	4
% Dead in Patch (area affected)	25% (10-40%)	1
	50% (41-60%)	2
	75% (61-90%)	3
	100% (91-100%)	4

Using this code system, a polygon would be drawn around the circumference of the entire plantation or stand. Then, each polygon would be labeled with the appropriate 3-unit code (e.g. YP1,4 = young plantation with dead patches covering approximately a quarter (10-40%) of total plantation area and 100% of trees within dead patches are affected).

Survey Information: At the end of each flight, the forester should provide the following information to the TFS Forest Pest Management office for each county flown:

1. Total acres flown in survey.
2. Total acres of pine and oak/pine within area flown (can be obtained from most recent forest inventory for each county).
3. Total acres of drought-affected forests mapped (total of all acres in damage polygons).
4. Estimate of total acres of dead trees for each stand size code (young plantations, mature sawtimber, etc.).

For example, to estimate acres of dead trees within a single polygon, use the average loss per code (25%, 50%, 75%, or 100%).

Thus, a polygon labeled YP1,4 that has a total acreage of 100 acres would have an estimated loss to drought of 25 acres
(100 acres x 0.25 x 1.00 = 25 acres)

Results: The results, together with recommendations for addressing the drought losses, will be summarized by the Forest Pest Management staff and distributed to all TFS District offices and to forest industry leaders. An article for private landowners will be prepared for the TFS web page and another submitted to the Texas Forestry Association for publication in the newsletter *Texas Forestry*. The FRD foresters will be responsible for identifying and notifying those landowners within each county that have severe drought damage and recommending treatment (salvage, replanting).

Drought Damage in Houston/Walker Counties

October 2000

OP1,3

ST4,4

YP3,4

YP1,4

YP2,4

ST3,3

Table 1: Aerial survey of drought/bark beetle losse four counties of East Texas **November 2000.**

County	Anderson	Houston	Walker	Montgomery	Total
Date flown	10/31/00	10/12/00	11/9/00	11/2/00	
Total acres flown	689,000	790,000	516,584	192,000	2,187,584
Acres of forest type	321,000	232,400	258,000	170,000	981,400
Acres of drought	132	1270	1290	555	3247
affected forests					
Total acres dead	44	417	398	167	1026
Estimated $ losses*	$49,935	$658,525	$777,705	$343,440	$1,829,605
% of total	3%	36%	42%	19%	100%

* Based on the following assumptions:
900 bd.ft/acre and $75/MBF for young pine plantations,
4500 bd. ft./acre and $150/MBF for older pine plantations,
6,000 bd. ft./acre and $370/MBF for pine sawtimber,
3,000 bd. ft./acre and $250/MBF for mixed age pine stands,
2,000 bd. ft./acre and $200/MBFfor pine/hardwood stands.

Table 2: Acres of dead trees by forest type from drought survey: November 2000.

County	Anderson	Houston	Walker	Montgomery	Total
Young pine plantation	8	92	42	0	142 (14%)
Older pine plantation	15	33	10	0	58 (6%)
Pine sawtimber	16	282	346	152	796 (78%)
Mixed ages of pine	5	0	0	0	5 (<1%)
Pine/hardwood	0	10	0	15	25 (2%)
Total	44	417	398	167	1026
% of total	4%	41%	39%	16%	100%